



In the evening crows begin to assemble in trees near the roost site at Chatham **Ontario**

22 flyways were used by the two million roosting crows. Counts at each flyway began about 2 hours before sunset. The average number of birds per flyway was set at 67 (31–127) thousand. This appears to be the highest reported number of flyways developed by crows at a roost. Later in the winter, some birds traveled as far as 60 km from the roost to feed ⁱ⁰¹.

In **Ontario**, weather had a definite influence on the behavior of crows returning to a roost. On calm air or with a tailwind, crows may be over 400 m (specks) high as they arrived from quite a distance at their sleeping quarters. When slicing through a headwind crows often flew a meter above a ploughed field, rising briefly to hurdle a hedgerow of trees between fields. Without these dramatic avian passages, the winter would be a static mixture of land and sky. The roost is an ink well; the crows are pens that give us winter's flamboyant signature.

A wintery roost near **Baltimore** captivated Edwards who described a flyway in vivid, fluid terms in the late 1880s ^{e12} –

I saw one of these vast divisions coming in for the night with singular regularity. If you will imagine a river one hundred and fifty feet wide and about thirty feet deep, its end a huge cataract by which the water falls to lose itself in a large lake, its beginning farther away than the eye can see, and if instead of water you will make this river of crows not so closely packed but that they can fly easily, and make the swiftness of the current equal to the ordinary flight of the crow, you may gain some idea of the stream which our party watched for over an hour without noticing any diminution in its bulk. And what a lake it made!

In **Maryland**, around 1825, Dr. J Godman wrote this tidbit for a local newspaper ^{g30}.

As the sun descended, and threw his last rays in one broad sheet of golden effulgence over the crystal mirror of the waters, innumerable companies of crows arrived daily and settled on this point for the purpose of drinking, picking up gravel and uniting in one body prior to retiring for the night to their accustomed dormitory. As the sun





At an assembly field in Woodstock **Ontario**, a crow landed (far left) on both feet, hopped about 25 cm, took a few steps, then took off using both feet (far right)

became entirely sunk below the horizon the grand flock crossed to the sand-bluff on the opposite side, where they generally spent a few moments in picking up a further supply of gravel, and then arising in a dense and ample column they sought their habitual roost in the deep entanglements of the distant pines.

In the late 1800s, Robert R Scorso of Afton **New Jersey** described the crows departing from a roost in the morning 2b4.

The birds usually fly in an irregular train with no particular order, but I have noticed exceptions to this. One morning just at daybreak, I observed the advance guard of about five hundred rise simultaneously from the woods to my left, and without a single “caw” fly over my head. They were about six deep, the long front dressed with military precision. They appeared to be on the same level. This battalion was followed by four more flocks, all rising successively from different portions of the woods or from separate groves; all in the same order and





about five hundred yards apart. They flew for some distance, probably half a mile, before the individuals on the left swung ahead and led their respective troops.

To appreciate the daily system of flyways of crows returning to the Essex roost in **Ontario**, I established a 46 km perimeter route averaging 6 (4–9) km from the roost. This distance proved adequate, as the crows spread out to feed over most of Essex County, which measures 35 by 55 km. The centrally located roost was in a deciduous woodlot at the town of Essex. My clockwise route was traveled twice on each of 10 evenings in late December and mid-February in the 1980s. The first round trip began two hours before sunset. The second round trip began an hour before sunset. Each round trip took 55 minutes to complete by car. A solid flyway was usually less than

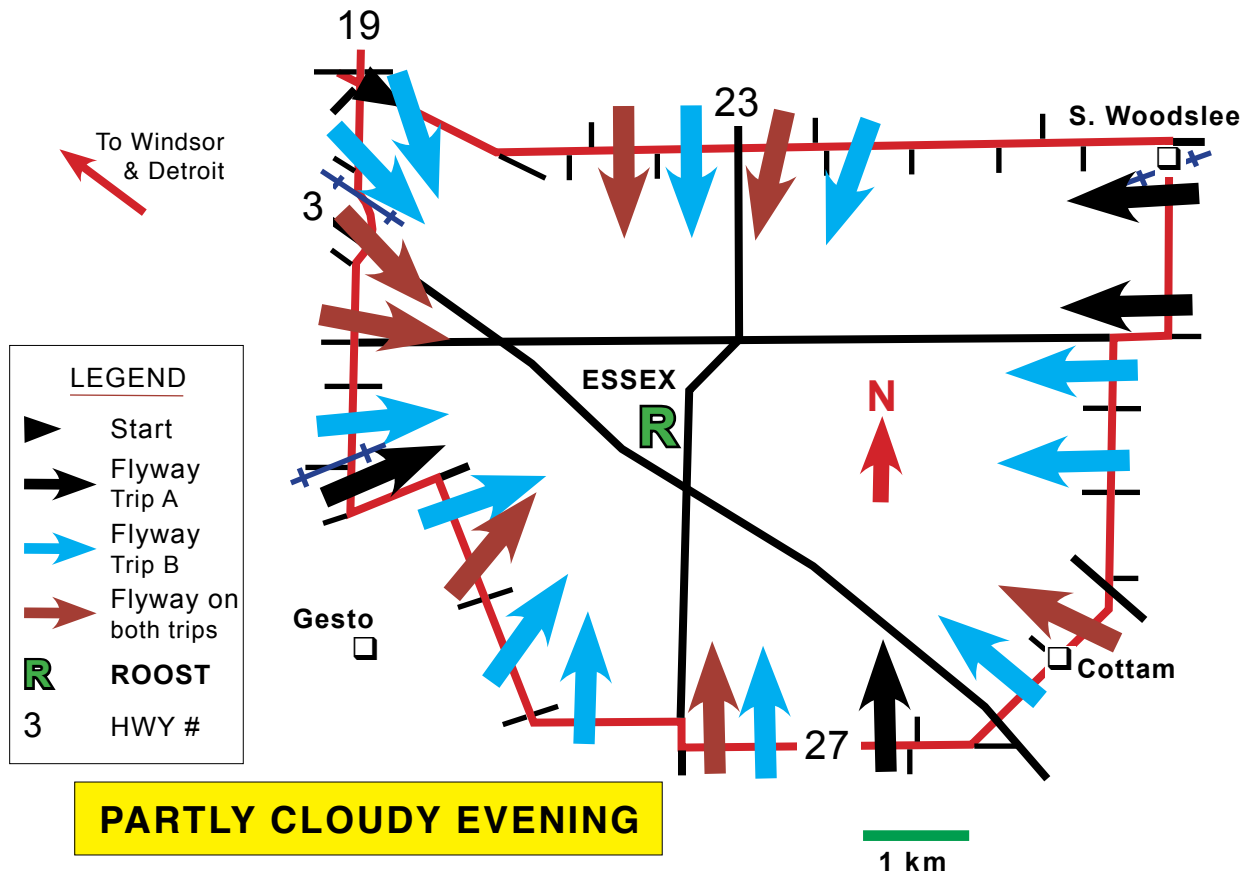
100 m wide with well defined lateral boundaries, making it easy to locate on a map. Separation of the flyways within one evening was easy, but less exact when map locations were compared day to day. Changing wind direction and velocity caused lateral shifts in the position of a flyway. Over the years 1984–'86, the most pronounced gap in flyways was to the northeast of the roost; a gap for which I have no explanation. At Fort Cobb, **Oklahoma**, there was a large area with no flyways southwest of the roost that was thought to mean less food in that direction ⁱ⁰¹.

When the number of flyways in Essex County were aligned with weather, changes in the number of flyways from the first to the second hour of observations were at times noteworthy (**Table 586**). On a clear evening the average number of flyways each hour (9 and 10) indicated an even, gradual return by crows to their roost. Under



The first group of American Crows in the morning's darkness are reluctant to leave the Essex **Ontario** roost. Some birds in this flock have turned (lower left) and are heading back to the woodlot to rejoin crows calling from the trees. Eventually the day wins and all the crows leave





584. Arrows show the direction and number of 11 evening flyways of crows heading towards the Essex Ontario roost 2 to 1 hour (trip A) before sunset and 19 flyways from 1 hour to sunset (trip B) on 25 December 1985, a partly cloudy evening with sunset at 5:05 pm. 7 flyways were recorded on both trips

cloud cover the majority of flyways (9 and 16) developed in the final hour (**Map 584**). Rainy weather altered the timing by crows going to their roost. Most of the wet weather flyways (7 and 3) were counted earlier in the evening (**Map 585**), and quite likely some were in operation three hours before sunset. These weather related observations generally fit with those at other roosts.

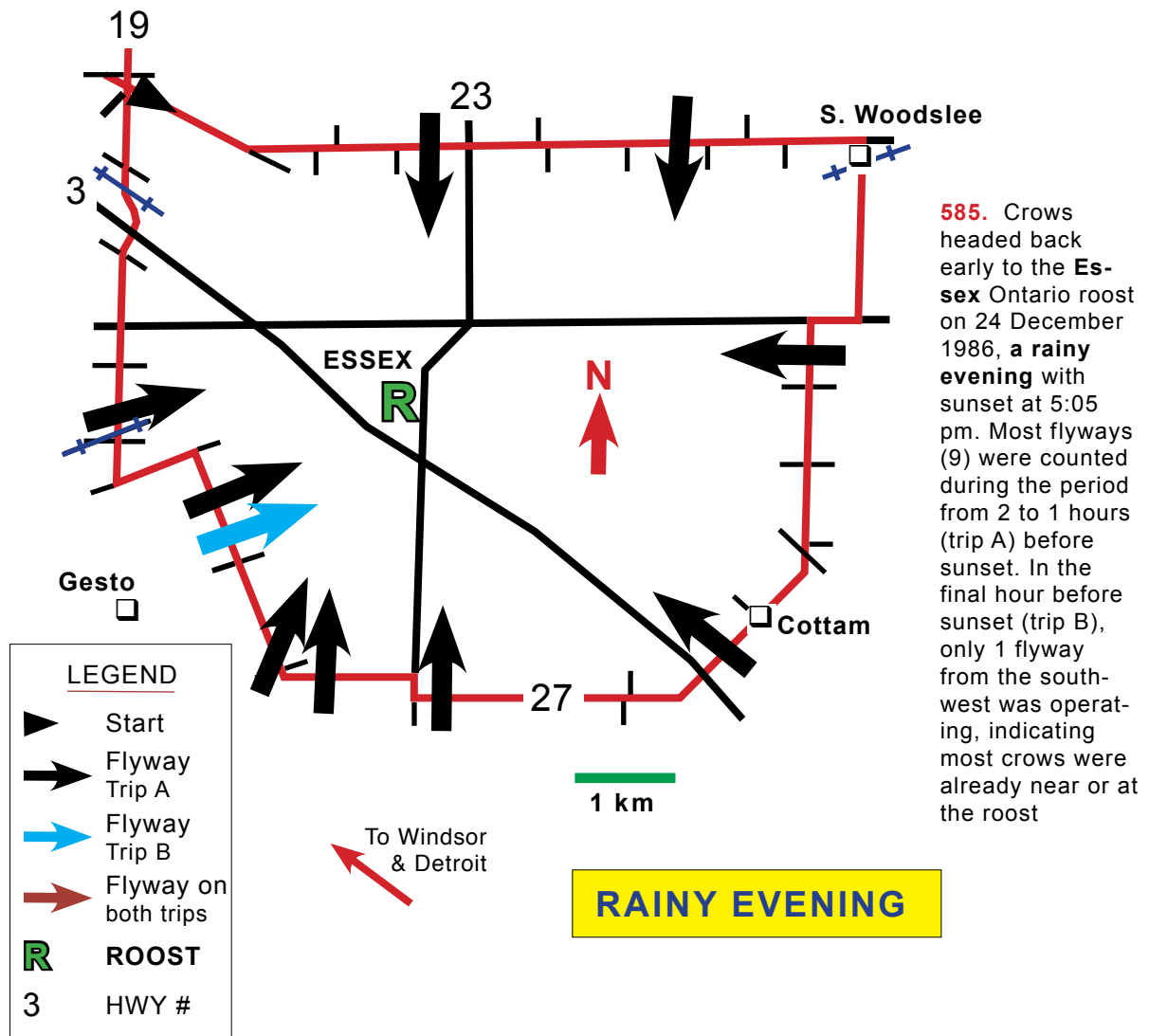
Crows roosting near the Toledo Airport in Ohio tended to head back to the roost earlier on days of heavy cloud cover, or on windy days compared to their returns on calm days. No relationship could be established between temperature and timing of flyways^{h04}. The first movements of the assemblies of crows to the roost was at about 1,000 (fc) foot candles or 10,764 lux, and when less than one foot candle (< 10 lux) was recorded, the last crows had entered the roost for the night^{j03}. [Full sunlight gives an intensity of 10,000

foot candles or 107,640 lux. An overcast day has an intensity of 1,000 fc or 10,764 lux]. Rooks left their feeding areas and arrived at the roost earlier when light intensities were reduced, and left later when sunlight highlighted their plumage^{0s1}.

Near Edmonton **Alberta**, (53° N) there was a small roosting population of 46–192 Black-billed Magpies. Their foraging areas were east of the roost, which allowed the birds to be easily counted and timed during their comings and goings each day (n 102). The magpies roosted in a dense stand of White Spruce, *Picea glauca*, along the slopes of a small stream.

In 1984 and 1985 the magpies left their roost and returned to it relative to the sun – later on colder, and cloudier, and longer days, when fewer birds were at the roost, and over the second half of the winter. Delays caused by heavy cloud cover in the morning did not necessarily translate into





higher levels of light intensity at their departures. In March, territorial behavior shifted the timing of roosting. The extreme times of leaving the roost in the mornings ranged from about 35 minutes before sunrise on clear mornings in late November and early January to about 5 minutes after sunrise on cloudy days in September. Evening arrivals of the magpies into the spruce were over a higher and a more variable light range of 24–1,174 lux (2–109 foot-candles) r_{29} . Magpies flew to the roost earlier on very windy days.

As evening flyways at the **Essex** roost were counted and mapped during the 2, hour-long circular routes, pre-roosting assemblies formed on the ground starting several kilometers from the roost. Assemblies increased in size, decreased

in number, and shifted closer to the roost as an evening wore on. The final surge into the roost came when one thick, intense flyway flowed from 1–3 very large, assemblies on open ground within a few km of the roost. Final assembly areas varied in their locations (sometimes nightly) around the roost depending it seemed, on which part of the woods or a field the crows elected to sleep in. This may indicate a particular roosting site was established hours before it was used. I was never able to predict a particular spot in the woodlot where the crows ended up tucking their bills for a night. The general plan was repeated annually; details changed nightly.

There were six assemblies (preroosting aggregations PRA) at Davis **California** in Decem-





586. The highest number of flyways of crows returning to the **Essex** ON roost during my 2 time slots were on partly cloudy evenings in December (plus 16 Feb). The fewest number of flyways were on rainy evenings during my 2 counts starting 2 hrs and 1 hr before sunset in 1984–'86

DATE**	NUMBER OF FLYWAYS			WEATHER	SNOW COVER
	Trip A*	Trip B*	TOTAL***		

22 Dec 1984	12	9	15	clear	none
23 Dec 1984	10	8	15	clear	none
24 Dec 1985	9	11	15	clear	5 cm
15 Feb 1984	5	12	16	clear	none
Average	9	10	15		

25 Dec 1985	11	19	23	partly cloudy	5 cm
25 Dec 1986	6	14	15	mostly cloudy	none
16 Feb 1984	9	14	20	partly cloudy	none
Average	9	16	19		

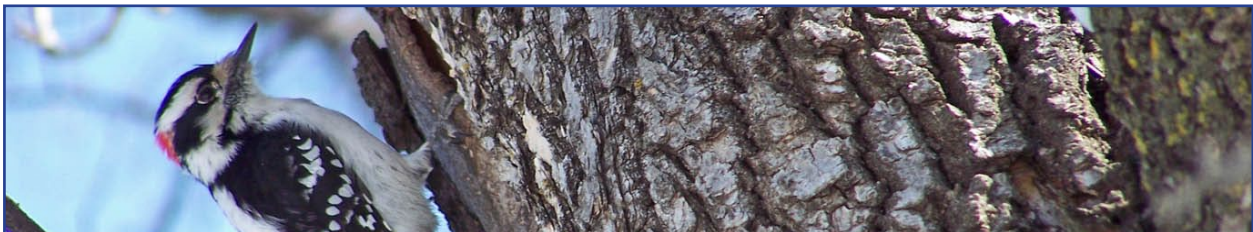
27 Dec 1986	7	4	9	drizzle	none
24 Dec 1986	9	1	10	rainy	none
24 Dec 1984	6	3	7	freezing rain	none
Average	7	3	8		

OVERALL AVERAGE	8	9	14		
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* About mid-October the wintery roost began to form; it was over by the end of March – 5.5 months long

** Trip A began 2 hours before sunset; Trip B began 1 hour before sunset; each trip took 55 minutes

*** Some flyways were counted on both trips A & B, which altered the total number of flyways per night



A Downy Woodpecker hunts as crows head back to their roost for the night





A small group of American Crows fed in a grassy area in the late afternoon within a city's limits prior to moving to an assembly before roosting in early December. They already know where to roost

ber, February, March and November in 1995–'96. No crows were marked or had radio-transmitters attached. About 250–2,700 crows were watched in several assembly areas. The same fields were often used, but at each field a different part was chosen most evenings.

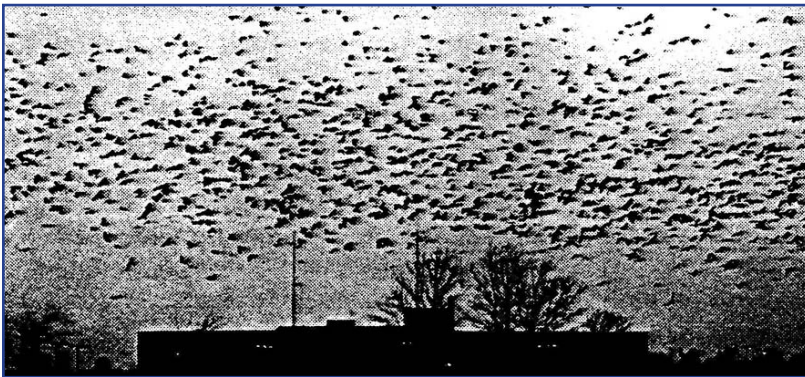
The two crow-watchers tried to fold 4 theories into the preroosting aggregations 48m.

(1) ROOST-LOCATION – Since crows roosted at the same site in the town of Davis, there was no need to gather information at the (PRA) to find out where the roost was located. This theory may not apply at other roosts

(2) FORAGING INFORMATION – Most incoming crows pick their own roosting spot in the trees. Incoming pairs stayed together only half of the time. Crows did not form groups that followed knowledgeable leaders out to forage the next morning

(3) SUPPLEMENTAL FEEDING AREAS – Some PRA fields provided food and some crows were observed feeding. Other crows formed a preroosting aggregation on a roof top where no food was available. Morning flyways from the roost extended for a dozen or more kilometers in several directions over the broad countryside of agricultural fields. Evening PRAs were formed near the roost and became larger and fewer in number as the sunset neared and the birds shifted closer to the final roosting area

(4) REDUCED PREDATION – The large number of crows in PRAs helped to reduce the risk to individual crows. When flocking, an approaching predator would be quickly noticed and allow time for the crows to react as a flock. Yet, I have never seen an avian predator at a PRA in Essex Ontario. In an online video of John Marzluff giving a lecture on roosting crows around Seattle Washington, he told of hearing



The final surge of thousands of crows along one low flyway leading into the deciduous woodlot used for roosting by the crows at Essex Ontario





Take-off by an American Crow

and seeing a Red-tailed Hawk, *Buteo jamaicensis*, kill a crow as it headed toward the roost in an evening's flyway. It was the first time he saw such a kill.

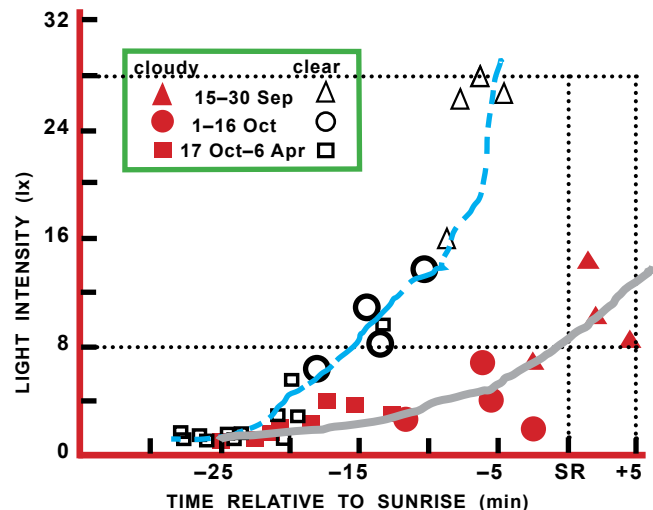
A human analogy – The assemblies leading to roosting by crows appears similar to our attendance at a sporting event. We spend the day living and eating on our home territory. We know where the stadium is located. As the evening approaches we hop into our cars and drive toward the stadium (roost) along a familiar route (flyway), eventually aggregating in several parking lots near the arena. Some of us may not be exactly sure where the stadium is, since this is our first visit to the city. As we neared the general area, we follow the congested traffic to a local parking lot (assembly or PRA). An hour before the contest begins, we stream into the stadium from our cars. Holders of season tickets (high status) sit in the same elevated locations for each game. Others sit in a lower different seat for each game. Our cars are vulnerable to predators, but people are hired to patrol the parking lots.

In southeastern **Norway**, 29 Hooded Crows were radio-tagged with a transmitter and harness (18 grams) in April and May over a total of three years, 1995–1997 15s. No landfills were available for feeding. The crows fed on farmland in a changing landscape. The total number of crows under study was low, ranging from 6–400. Crows were located in the daytime at a feeding site, at a pre-roost site, and at a communal roost if one was used during the spring. The study site was 110 km² and contained 81 different roosting sites – 56

communal and 25 on territories. For these Hooded Crows, the pre-roost assembly was partially dependent on sex, status, and snowfall.

Often the pre-roost assembly (PRA) was not in a straight line from the daytime feeding locations to the communal roost, hence additional travel (almost double the distance in some cases) was necessary to join a pre-roost group. This indicated the pre-roost assembly was not simply a gathering of crows along their direct path to the communal roost. Crows forming a pre-roost gathering usually ended up at the same roost.

In some cases, travel from the pre-roost assembly back to the nesting territory to sleep was much shorter than the travel distance to the



588. EDMONTON On clear mornings, magpies in Alberta began leaving the roost the earliest at light intensities of about 2 lx (0.02 fc) around 28 minutes before sunrise, and were usually gone before sunrise (SR). On cloudy mornings the departures were delayed by several minutes. Blue and gray lines hand-drawn and not in the original r29, © Canadian Science Publishing or its licensors





Thousands of crow tracks trample the light snow on one pre-roost assembly field in Woodstock **Ontario**. This field was about 1 km from the final roost site, 10 December 2011

communal roost. And a few times crows did take the shortest route and returned to their territory to roost. Breeding pairs of Hooded Crows (17 of 20 pairs or 85%) kept together from the pre-roost assembly to the communal roost in 8 of 17 (47%) cases. The pre-roost assemblies (PRAs) appeared to serve four functions –

- (1) a feeding area that supplemented the daytime territorial feeding area
- (2) helped a bird end up at a communal roost
- (3) allowed some crows to gather information from informed crows on good foraging sites for the next day
- (4) reduced the likelihood of predation 15s

I would like to add a fifth (5) reason. Based on the results below from Alabama, PRAs gave time for birds at a large roost to *slowly* gather together in a few concentrated locations from a dozen flyways. It was a time of unhurried organization

that allowed crows to engage with each other and coalesce as they moved toward the roosting woodlot or field for the winter's night. It is a daily social event.

When walking through areas used as pre-roosting assemblies by American Crows in southern **Ontario**, the one thing I noticed was some crows always pecked at small exposed pockets of gravel to obtain grit, even with a few centimeters of snow on the ground (**Photo page 589**). The snow also revealed the crows did a lot of walking, even though an open frozen assembly field with patches of dry wildflowers, appeared to hold little if any food. Earlier in the evening at other assembly locations on bare ploughed crop fields, the crows were massed together, facing in the same direction and appeared to be feeding.

The social organization at a winter roost in northern **Alabama** was studied using a roadside and video censuses. Overall, groups of 8 or fewer crows existed most often throughout the year. This was the underlying core social structure, which may have been the breeding family unit. A grid on a lawn used as an assembly (staging) area in the evening was defined. The grid revealed that movements by the crows were not random. Crows were grouped here as well. More of the crows on the ground were clumped and within 5–15 m of each other, than random models suggested. These crows generally stayed together. This indicated staging areas on the way to the nightly roost were used by crows to regroup



Tiny pockets of gravel in a pre-roost assembly field are often used by crows that need more grit in their gizzard. Woodstock **Ontario**, 10 December 2011





into smaller social core groups before moving to another staging area and finally the roost ^{l37}.

Twittering birds fly past to roost.
Twinkling stars move over ten
Thousand households. The full moon
Enters the Ninth Constellation.

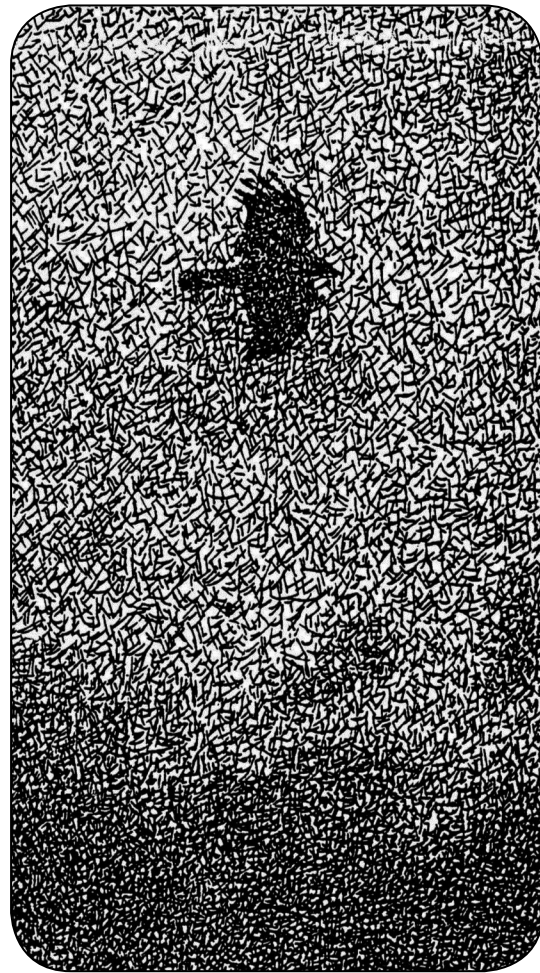
– Tu Fu ^{r47}

Evening flyways ruptured the air. Thousands of crows per minute were passing overhead. On a calm evening, when I stood under a low-flying mantle of crows 100 m from the roost, a soft downdraft from their wings caressed my face. In the roost, deciduous trees swelled, darkened and sagged under the weight of thousands of black leaves.

About an hour before a clear sunset, the first dozen crows perch atop the tallest deciduous trees in Tulle's Bush at the Essex **Ontario** roost. Were these first dozen birds of high status, which allowed them to lead the way and perch where all the crows can see who and where they were? Ten minutes before sundown 1,000 birds adorned the treetops. In darkness the last crows entered the woodlot 90 minutes after sunset. The average time for the last birds to enter the roost on eight other visits was 62 (40–87) minutes after sunset. Roosts with few birds fill more quickly. At a 20,000 member roost in **Ohio**, 75% of the crows entered a woodlot in a 30 minute period, from 20 minutes before to 10 minutes after sunset ^{h04}. In early November, 5,000 crows entered the St. Catharines **Ontario** roost along an eastern and a western flyway, ending 4 and 12 minutes after sunset. This same flock of crows at St Catharines usually entered the roost around sunset, bracketed by 10 minutes before and after ^{k79}. But during one late January evening, crows assembled at Brock University **Ontario** and at 45 minutes after sundown they began moving toward the roost. In contrast, on a wintery day in **Guelph**, a courage of three territorial crows (a family) began to enter conifers for the night one or two hours before the sun had set. They did so quietly and with no flare.

Among members of a flock of 15 captive Jack-

daws, aggressive behaviors were more common at perches than at food, and the higher ranked birds were the most active in social interactions and won these most often ^{l74}. This may be the reason there is so much quarreling and calling at crow roosts after dark. The thousands of birds are each trying to obtain the best (higher?) perch in a tree in darkness. The voices may serve to indicate a crow's social status. If so, the crows are not recounting their so-called *marauding* adventures (whatever the hell marauding means) during the day, as some early accounts suggested. Near Ipswich Beach **Massachusetts**, Townsend provided a stirring account of about 12,000 crows that roosted on Castle Hill ^{t71}. Here is a small excerpt from what he wrote one evening in the early 1900s –



Last crow approaches the **Essex** roost after sunset





A downy hunting

The noise and confusion were great. It would seem as if the roost was so crowded that the birds had to wait their time for a chance to get in and that a constant shifting of places and crowding was necessary before the Crows could settle in peace for the night. Hence the prolonged varied conversation: hence the profanity.

It was an intensely interesting experience, this observation of the return of the Crows to their night's lodgings, and one wished for eyes all about the head, well sharpened wits to interpret and a trained assistant to take down notes.

My arrival at the top of the Hamilton **Ontario** escarpment one wintery evening placed me three hours ahead of the sunset to watch the first crows sail in. From five similar visits, the first arrivals at the cliff averaged 130 (80–196) minutes before sunset. The range in which the last crows arrived at the roost was 51 minutes – from 19 minutes before to 32 minutes after the sunset. Using these extreme times, the entire flyway procession, from the first to the last crow in, could take 3.8 hours. A simple calculation for a day in January produced a period of 17 hours without feeding for some of the roosting crows. Similarly, Jackdaws roosted at Orebo **Sweden**. From the first arrival of the birds in late afternoon until their departure from the roost early the next morning, about 17 hours without feeding occurred in mid-winter 989.

The first small group of American Crows arriving at the Niagara Escarpment in **Hamilton** in late afternoon appeared undecided as to where to as-

semble / roost. They did have quite a choice. The crows gathered on different evenings in a small segment along 4 km of the escarpment woods, from behind the Psychiatric Hospital eastward to below Mountain Park. Crows may shift position along the cliff several times. On 12 September, while the roost was small, a dozen crows settled into trees 80 minutes before sundown. Five minutes later, one crow landed 400 m to the east. The initial dozen quickly joined this one bird. (Was it a high status bird, or leader?) Thereafter, the incoming birds joined this small flock to position the assembly area. When the flyways were over, the 600 assembled crows shifted 200 m west and roosted in deciduous trees along the steep cliff. Later in the season, when the roost was much larger, and the birds sometimes roosted in the city's core after a pre-roost assembly on the escarpment, their final flight of 2–3 kilometers from the dark cliff to the glowing streets in the city's core was in darkness.

Several crows fed briefly in September at the escarpment after they assembled there. Part of the flock descended to the base of the deciduous trees and swept aside leaves with their bills as they searched for morsels or gravel prior to sleeping. This was the only instance I have seen or read about of crows feeding on the floor of a roosting / assembly woodlot.

I wondered if the first birds to arrive at the assembly / roost were well fed and under little stress? This allowed them to leave the fields early and head back to the roost. Moreover, it would be interesting to know if the first birds to arrive at the roost were the same ones on many evenings, and what their age and status were? Finally, how far away did these early arriving crows feed and in what habitat?

The size of a typical winter assembly / roost on the escarpment extended 100 by 300 m along the east–west axis of the steep, north-facing slope. Crows spread themselves in darkness throughout dozens of trees. About 50–100 birds in a suitable treetop seemed right early in the evening. There was much movement from tree to tree, and from a steady stream of arrivals. Later, after dark, when the crows had descended to the city streets, one large maple may support 500





sleeping crows.

When crows decided to roost in downtown Hamilton, the escarpment cliff was usually emptied of its black treasure in about 5 minutes. The departing trip varied from sunset to about 30 minutes after. One evening, with snow falling, the crows lingered along the top of the escarpment until 45 minutes after sundown. Their position, high in the trees, indicated a willingness to leave for the core of the city, which they eventually did. Lacking enough data to be conclusive, it appeared the crows roosted on the escarpment in the autumn and spring, and roosted in the city's core in the coldest months, after using the escarpment as an assembly area.

Occasionally, someone suggests a shift in roosting position is the result of Great Horned or Long-eared Owls visiting a crow's roost ¹⁰⁹. During my many visits to the escarpment, I have not noticed avian predators that might cause crows to vacate the quiet, dark escarpment in favor of concrete, noise, people and lights. When downtown, the crows were quite sensitive to people below them. Four hours after sunset, as I slowly walked beneath the flock in small trees near City Hall, 100 birds flew off. Silently, and like gray ghosts lit from below against the black sky, within a minute they circled and resettled into the trees. In contrast, at the Essex roost two hours after sunset, I made my way slowly through trees to within 20 m of the birds. Crows sat low on branches. They showed little concern over my presence. I was facing a solid wall of blackness.

Iams and a crew of eight entered the Fort Cobb roost in **Oklahoma** for two hours one night in February 1966. The men caught 75 crows by hand when the ground was damp. In dry weather, walking noisily among the post oak and blackjack thickets kept the crows on edge and reduced the number captured by hand ¹⁰¹.

Replacing life's worries and thoughts of the future was a picture only the crows at **Hamilton** could paint. Standing at the base of the escarpment under a darkening blue sky, my eyes were trapped by the final stream of birds pouring over the top of the cliff from the south. It was an autumnal stream – a strong current filled with eddies. Ten birds in five pairs went into twisting, primary-tearing dives. In these short bursts

of straight-down-adventure, or the “daring elegance” of Rhoads ¹⁴⁹, crows enjoyed their fastest flight of the day, accompanied by long guttural calls to complement their ripping the air. Were the pairs of birds mated, or juveniles testing the limits of their aerial talent? Most of the incoming crows, however, descended in long open spirals, some moving clockwise, others in the reverse direction. There were three layers of blackness. Sixty meters away, the closest birds were calling from tree-tops. Above the trees, the descending crows were a tumble of blackshirts in a band 100 m wide. They crossed and interfered, some with passion, others less quickly. Higher yet, at the top of the cliff, a hundred new black droplets in a flyway were continuously added to the top of the cas-



As the crows roost in the winter, this Western Painted Turtle is buried in the mud of a pond to stay viable over the winter

cade. Then, in semi-darkness, this last flyway into the assembly was abruptly over. My gaze shifted from the dark blue empty sky to the trees below, full and noisy with a courage of crows. I absorbed their spirit for another twenty minutes, then drove





home with my inner vision an inarticulate tangle of black.

In the 1880s, Rhoads detailed evening flyways assembling prior to roosting ^{r49} –

The course adopted in assembling to and departing from the chosen spot is uniform everywhere. About an hour before sunset stragglers begin to appear, reconnoitering as it were to see that the coast is clear, and returning whence they came as if to inform the main body of the result. In the course of half an hour the flocks begin to arrive



The “daring elegance”, or straight-down-adventure by two crows over the **Hamilton** roost. In these wicked dives, the crows may reach 100 kph

in broken lines and detachments from all quarters, and, if the evening be calm, their earthward descent from a height of many hundred feet exhibits aerial prowess surpassing in daring elegance those of any other land birds with which I am acquainted.

It is their invariable custom to descend to some spot in the neighborhood from one-half to a quarter mile from the roost, preliminary to assembling there for the night’s repose. This may be either upon the adjoining fields or on woodland tracts near by.

The aerial evolutions of this descending multitude, coupled with the surging clamor of those which have already settled as successive reinforce-

ments appear, and which at a distance greatly resembles the far-away roar of the sea, may justly awaken emotions of sublimity in the spectator. To descend almost perpendicularly from a height one thousand feet above earth to the very tree-tops and then to glide above them on half-closed wings with a resultant momentum that is almost startling in its arrowy velocity, is a favorite manoeuvre, and when two such playfellows pursue each other in this headlong swoop their turnings and twistings and doubling contortions amaze the beholder. It reminds one of lightning in feathers, but the results are surprisingly harmless, and it may better be compared to a shower of day meteors whose “radiant point” lies somewhere in East Pennsylvania. Until sunset this novel scene continues without interruption, whilst field and forest in the vicinity of their great dormitories are shrouded by the thousands which have alighted, and, were it not for their deafening clamor, the living pall which overspreads the scene might well suggest a land of mourning and death. When they settle on the ground on such occasions they resemble gulls on a sand-bar, each standing motionless with its head toward the breeze. The whole thing seems unnecessary, as they mostly do nothing but cry out to their companions in the air and tumultuously applaud their hair-breadth escapes and feats of daring, yet sitting quietly until the setting sun warns them to make ready for the last act— “going to bed.”

In the middle of the night
Spirits fly about and strange creatures stir.
A murmur runs over the high grass
Although no wind blows

– Mei Yao Ch’en ^{r47}

Morning madness

Two hours before sunup I am near the Essex roost. Birds are awake and aware long before they start their morning chorus. When I pulled off the road and stopped, 300 crows quietly left the nearby trees but resettled in a couple of minutes. As the game was played, for 10 mornings in all kinds of weather, the first crows





made bouts of regular caws 72 (56–112) minutes before sunrise.

The start of civil twilight is when the center of the sun is 6° below the horizon regardless of the time of year. This registers as 0.04 foot-candles (0.43 lux) of light intensity ¹³⁵.

At the **Essex** roost bouts of caws were readily separated among flock members during the first 20 minutes of calling before sunrise. Thereafter caws blended together as more voice boxes began to play. Birds were starting to hop upward in the trees and made short flights to higher limbs. Vocally, the Essex band was really starting to rock. A soft gray light painted the dawn. Without warning, 500 birds quietly sailed from the trees. Seconds later they swung back over the roost and resettled onto branches. The birds seemed beset with mixed feelings. The light and maybe their hunger told them it was time to leave, but the calling of crows at the roost bid them to return.

Finally it happened. Accompanied by a rapid crescendo of calling, a jet of blackness emanated from the woods. Some crows twisted in the air, flexing their wings and bodies as they disappeared into the morning's darkness. Others landed in a field (post-roosting assembly) less than 300 m from the roost where they loitered for 10–30 minutes before continuing on to the fields. The stage was replete. The noise and abundance were elegant and emotional. This much perfection will be remembered. Three or four times before sunrise, the music quickened and rose as the crows, not content with their usual morning madness, suddenly tripled their vocal output. The flare-up was quickly over, but already a mob of crows had heaved itself into the sky and made the air swirl and bend to its will. The crows were in control. Sheer numbers won. The day began. Birds left in all directions from the roost. Another sunrise was almost upon them. Shinning eastern clouds, distant and still, were the antithesis of this black imagery. Later, as the maturity of the passage subsided, individual bouts of caws regained their own identity, and a single crow was observed without distraction.

What began as one of my regular pre-dawn watches at the Essex roost turned into a powerful exuberant avian display. I put down my pen, made my head comfortable, and stared at the blackshirts. From the central dark core of birds in the trees, a change took place. An invisible aerial tunnel 30 m in diameter suddenly formed, and through it crows began to rush, to flood from the bush, not in the usual rising manner, but parallel to the ground. As this explosion of crows began, the calling intensified to such a level it became more than a mere blending of caws. It grew until an elevated pure note was reached and sustained for one minute. It became a scream of the multitude. And the crows, as if propelled by this engine of sound, were ejected faster it seemed, than they could fly. Like leaves in a wind tunnel, their movements were forced and directed. In that one minute 30,000 crows must have shot out of the roost. I have not witnessed a black magic of such potency since.

If one has to get up early, it might as well be to observe crows. At the **Essex** roost, the initial time of departure for the 100,000 crows on 12 mornings was 42 (32–56) minutes before sunup.



A White-breasted Nuthatch feeds on sunflower seeds in my hand – January 2010, **Winnipeg**

On mornings with stars overhead, crows called and left the roost 10–20 minutes earlier than when it was overcast or raining. In **Ohio**, at roosts of less than 20,000 crows, the initial departures were at an intensity of two foot-candles (22 lux). Within a range of 6–34 foot-candles (65–366 lux), 90% of the crows made their departure ^{j03}.





An evening sky and trees with crows before roosting at Woodstock **Ontario** in December

As we should expect, other species react similarly to intensities of weather and light. Roosting Rooks enjoyed a mean time of departure about 45 minutes before sunrise^{0s1}. In October, in a communal mixed roost of starlings and Bronzed Grackles in her backyard, M Nice gave an average time of departure for starlings at 11 (5–14) minutes ahead of sunrise. Grackles left the roost a little later, averaging 7–9 minutes prior to sunup. Cloudy skies caused the birds to delay their departure, and generally they began calling about 30 minutes before sunriseⁿ²³. In a group of four Great Tits, the dominant male left the roost earlier than other males of lesser status^{d75}.

Returning to a morning's departure at the roost in **Essex**, sunrise was only a few minutes away. Overhead there was more sky than crows to look at. The trees of Tulle's Bush were mysteriously empty. Tens of thousands of crows had evaporated from the branches. Anyone driving past would find nothing remarkable about this woodlot. With only a handful of crows lingering about, it resembled dozens of other woodlots in the county. The difference stayed with the crows. They had insight and memory, and that alone was what mattered.

When crows decided to roost on the ground, additional observations were possible, compared to when the roost was botanically situated. The thick black coat of icing on a bare snowy field was not a very cryptic position for the flock. This morning, 26 December 1981, the Essex crows were

southeast of the woodlot where they usually slept. Irregular in shape, the dark flat mass tapered abruptly to open field. From my removed, low position, the clot of crows looked quite solid. At the first whisper of dawn, small groups of 20 birds swirled up and then dropped into another section of the flock. Obviously, there was enough space between the birds on the ground that allowed additional landings (**photo 596**).

The dawn chorus increased and 42 minutes ahead of the distant sun on this cloudy morning birds began to leave the roost. Light was creeping about, exposing my world and theirs. Ten minutes later, amidst continuous calling, individual crows rose from many parts of the grounded flock and each sailed away in different directions. Birds that slept at the east end of the flock did not necessarily head out in an easterly direction. Consequently, birds were crisscrossing right above the ground. Predators did not disturb the morning's departure. In the -4°C air, the birds left in their ordered arrangement, briefly peaking at about 50 birds a second. At sunrise 2,000 bits of blackness remained on the ground. Most of these crows were low and still—two were dead. Those exhibiting a little fire, slowly walked about and pecked at the frozen field, preened, or took to the morning's air without calling.

Later that evening, the Essex crows avoided the woodlot and again settled directly onto the same snow-covered ploughed field from the adjacent assemblies. One hour after sunset, the





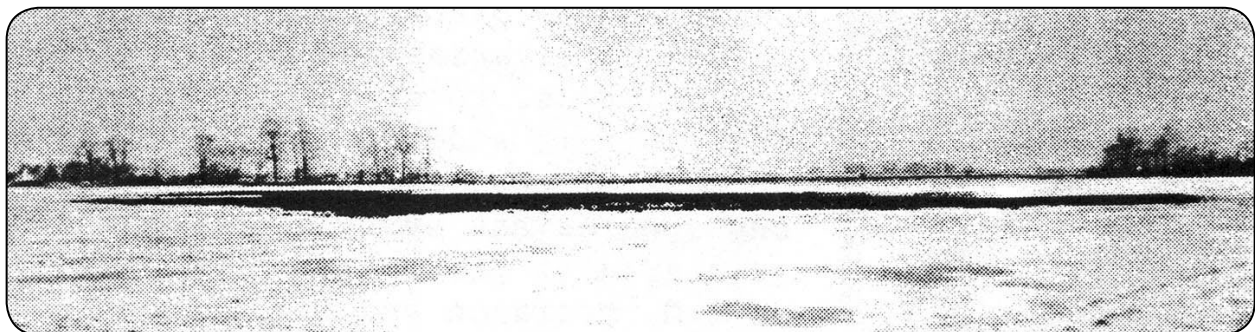
Part of the 50,000 crows near a pre-roost assembly over farmland in southwestern **Ontario**, early December 2011

incoming flyways were finished. There was no antagonistic calling because the birds did not quarrel over who got the best perch. No branches collapsed during the night from the weight of too many crows. A state of harmony and sleep were achieved in record time.

The Essex roosting area on the ground was about 100 by 300 meters. Filled with an estimated 100,000 crows, this averaged about 3 crows per m^2 , a reasonable figure. It would take a quiet 5 cm snowfall throughout the night to better define the positions and size of their sleeping arrangements. This hadn't happened. I believe temperature has little to no bearing on crows deciding to

roost on the ground in southern **Ontario**. Perhaps they simply like variety in where they sleep, or they need a good night's rest without the quarreling over perches. This field is now covered with a new subdivision of homes, each with a pristine blue swimming pool. Crops and crows are no longer possible on this parcel of land.

In the winter of 1966–'67 in **Oklahoma**, the crows at Fort Cobb roosted on a 1.5 ha field in the center of the treed roost for about a week. On this field it was possible to canon-net them for banding ⁱ⁰¹. In **Oklahoma**, when crows roosted in trees ^{h94}, they averaged 0.7–1.1 crows per m^2 . The average was 5.4 crows per m^2 in the canopy



ESSEX ONTARIO, 1980s At -10°C with a light wind, the entire flock of 100,000 crows slept on a snow-covered field about 150 m from the woodlot usually used for roosting. The flock left this field the next morning. As usual, predators were not obvious to me. A few crows were dead in the morning, which is normal for a roost of this size. When crows roost on the ground they are much quieter. This field is now a subdivision





at other roosts in the state a11.

In Springfield **Ohio**, about 300 crows from a roosting flock of 2,500 birds slept on the ground at three separate parking lots. The ground was snow-covered, but most of the snow on the parking lots had been removed. Other crows roosted in nearby trees on 12 January 2010 with a low of -12°C and wind gusts to 80 kph. The crows seemed to ignore local traffic on wheels and in shoes. Some crows, 2.5 hours after sunset, were roosting on the roof of a public library. Perhaps there is a thermal advantage to roosting on the ground in cold windy weather s73.

Flyways and ground roosting by thousands of crows at or near an airport can pose a major problem to the travelling public. A radar operator at the Toledo Airport in **Ohio** saw crows on the ground between runways j03. To help manage this crow population and reduce bird strikes on aircraft,

nearby woodlots were cleared or thinned. Acetylene exploders and men with shotguns disturbed the crows, which caused them to shift to more distant roosting locations. As the two researchers pointed out, only when other suitable roosting sites were present nearby was it advisable to try and move crows from an active roost.

Inside the roost

Roosting in trees is the norm. Thirty minutes after sunrise, twenty crows linger in deciduous trees. A few birds, unable to fly, walk over bare fields beside the roosting woodlot in **Essex** County. After a cold, calm night, a layer of frost covers their back feathers. Leaving the comfort of my powerful car, I began my morning walk through the roost. It was quiet and still.



Evening crows moving from assembly to assembly in Woodstock **Ontario**, December 2011





Entering the edge, where corn stubble ended and deciduous trees and shrubs began, my sense of smell achieved a vigorous workout. The odor of crow shit was pungent, but not obnoxious. The smell quickly diminished. Where I was triggered the return of a poem –

ANIMAL

Wildness is what we know
 We remember
 In spite of all things.
 It comes infrequently
 End of a long day
 Moment between sleep and waking
 Burns an image.
 Bored with being erect
 We descend
 Below our ranks
 Bend to our haunches
 Back in high grass.
 Return the pattern
 Smell air for changes
 For food or the scent
 Of some new mate calling.

– Christopher Woods 1985 35w

Where crows slept, the trees and ground were splattered with shit; some dripped from branches. Small contour feathers were stuck to branches by the shit, and a few large wing and tail feathers merged with the floor. Small trees were permanently bent from the weight of their nightly visitors, and some large limbs were broken.

Below trees repeatedly used by roosting crows, a tan pancake, about 5 cm thick and as wide as the crown of a tree, circled the trunk on the ground. It was composed of thousands of regurgitated pellets and crow shit. When the tree was visited in the summer, and the soil disturbed with a shovel, grit (fine gravel) from all of the dissolved regurgitated pellets was evident.

On their own, trees are an animated part of our floral landscape. Alone or in groups, they inspire artists, poets, crows, naturalists, foresters and scientists. The Impressionists painted trees



Migrating crows or those at a winter's roost near an airport could disrupt air traffic

(perhaps too many) bathed in luminous sunlight.
 David Scott described trees as –

swallowers of earth and water
 scratching posts
 notice boards
 bird landings

Botanists show us how to identify a tree by the size, color, shape and texture of its leaf. Trees provide many benefits and certainly not the least is a place for crows to sleep. Whether it is a simple or complicated process, this choosing of trees for sleep is not fluently understood. Crows in the four large roosts in southern Ontario in the 1980s



At the **Essex** roost, this well-worn tree was a favorite of the crows in the winter. Below it was a large thick pancake of regurgitated pellets





usually slept on deciduous branches. At Essex, crows used several sections of a long rectangular woodlot. Generally, they used the northern end in the autumn and sometimes shifted to the middle or southern end by early winter. On any night only a very small portion of the woodlot was actually used. For instance on 26 December 1982, I took 550 steps (meters) to outline an area occupied by the sleeping birds. Among the trees used for roosting, two 30 m² plots were set at each end of the woodlot in August 1985. Deciduous trees included ash, elm, oak, basswood, hawthorn, maple and hickory. Within the plots, tree diameters at breast height (dbh) were measured. Trees less than 3 cm in diameter were not taken seriously as a suitable roosting medium for crows, but that was only an uneducated guess. Similarly, a dead tree with a few remaining brittle branches was also ignored. Combining the two plots, 473 deciduous trees were measured in 1,800 m². This translated into 2,628 trees per hectare. No other botanical survey of a crow roost was available for comparison. In 14 blackbirds roosts in **Ohio**, the mean number of deciduous trees per hectare came to 7,746 1m9.

At the roost in Essex **Ontario**, the average

dbh for a tree was 8 (3–44) cm with 70% of the diameters in the 3–9 cm range and 30% 10 cm or larger. Although the largest tree in the two plots had a dbh of 44 cm, the thickest trees outside the plots were the oaks in the 60–70 cm dbh range. The towering oaks became top heavy as the first crows at the roost in the evening settled onto their branches. The upper branches afforded the best view and advertised the location to incoming birds [my simple interpretation]. The lowest I have noticed sleeping crows was slightly less than 2 m above the ground. Near the center of the town of Essex, part of the large winter flock slept in maples, 14 of which had an average dbh of 60 (44–70) cm.

In Woodland **California**, 62 trees not used for roosting were compared to trees used for roosting. The 87 trees used for roosting had a greater height, 18 vs 13 m; diameter breast height, 62 vs 46 cm; crown diameters of 13 vs 10 meters, and greater crown volumes of 854 vs 421 m³ than the 62 non-roosting trees. In commercial areas, trees chosen for roosting had more pavement and traffic below them than did similar trees in residential areas, and compared to a subset of trees not used for roosting. Ambient light levels and



American Crows dazzle the senses by filling an evening sky in southwestern **Ontario** in December





Open water is an attractive element to crows roosting in the winter and nesting in the summer

temperatures were also higher at trees used for roosting compared to trees not used^{v18}. At the four crow roosts in southern **Ontario** I visited in the 1980s, deciduous trees were usually the main style available for roosting. Occasionally, a few dozen crows spent the night in planted conifers in downtown Hamilton. From various studies, the tree species available were the ones chosen by crows for roosting (and nesting). These ranged from redwoods to olives to scrub oak; spruce to pine. At the large roost in **Oklahoma** near Fort Cobb, the crows used Blackjack Oak, *Quercus marilandica*, Post Oak, *Quercus stellata*, with understory dominated by Skunkbrush, *Rhus aromatica*, and Buckbrush, *Symphoricarpos arbiculatus*.

To sample the trees used by crows in **Hamilton**, I followed a well-worn trail through the escarpment where the crows assembled and often roosted. Starting near Jolley Cut, I traveled eastward through the upper section of trees along the cliff. Trees were measured out to about 5 m on both sides of the trail as they became available during the three hour pilgrimage. The steepness of the slope prevented me from setting plots. The 473 trees measured were similar in number to the Essex sample, but they were about twice as large with an average dbh of 15 (3–64) cm. Only 40% of the diameters were in the 3–9 cm range and 60% were 10 cm or larger in diameter. Maple, ash, poplar and birch were available for the sleepy crows. Near the public art gallery in downtown Hamilton, 36 pine and deciduous trees used by roosting crows had a dbh of 18 (11–26) cm. By City Hall and the Whitehern Building, 34 planted deciduous trees sometimes used by sleeping crows averaged 44 (21–92) cm in diameter.

Soil at the roost

Tulle's Bush at the Essex **Ontario** roost is where I gathered 16 soil samples on 1 September 1980, about five months after the winter's roosting was finished in March (**Table 602a**). From a "similar" deciduous woodlot 3 km away, but not used by crows for roosting, 16 samples provided the necessary control.

Closely following the end of the 1980–'81 roosting season, two additional sets of 10 samples each were gathered in April. One set came from beneath the trees – (1) that held thousand of birds a month earlier, and (2) from a portion of the roost not used as often or perhaps as recently (exactly when I don't know). **Table 602b** below compares the fertility levels of the two sets taken on 16 April 1981. At this time P and K elements were more concentrated compared to the samples taken 5 months later in September.

In **Oklahoma** (35° N) in 1976–'77 Hicks sampled soil (**Table 602**), at the Fort Cobb Lake roost, which had existed for about 45 years^{h94}. In the late 1960s, about 1–2 million crows occupied two roosts (north and south) about 4.5 km apart based on flyway counts. Crows usually arrived in October and began to leave in March. At the north roost, the average deposition rate of





crow shit was 7 g per m² per night, from 17 separate deposits per m² per night. At the south roost the rate was 11 g per m² per night. Within this range of 7–11 g per m² per night at the roosts, this amounted to 2,576–3,941 kg (8,688 lbs) of shit per night for the south roost which Hicks estimated held 250,000–400,000 crows. The densest cover provided by the trees did not correspond to the highest number of sleeping crows based on the amount to guano on the ground. His two soil samples were even more exploratory than mine. Crow shit is slightly acidic (pH 6.4). Non-roosting soil registered a pH of 7.5 compared to 4.6 and 5.6 (average 5.1) for the soil at the south and north roosts respectively at Fort Cobb.

The clay and loam soils of Essex County **Ontario** have a high buffering capacity that allows them to absorb a large amount of nutrients before any change in pH is announced. In all three **Tables (600 to 600b)** potassium existed at a level higher than did phosphorus. Both nutrients are highly mobile. In the control woodlot in Essex County, potassium was naturally high and almost equalled that in the roost's soil which had been without the presence of crows for six warm months. Phosphorus, naturally low in the soil at Essex, increased dramatically from the large amount of shit by the crows

Sleep

All this writing about roosting has started to make me sleepy. What do we know about sleeping in birds? Few observations have been done on crows. But with many crows sleeping in cites, at times within a few meters of a powerful street light, any person with binoculars or a scope could make a contribution to this little understood behavior. I have observed the head turned and the bill tucked into scapular feathers; the head facing forward and drooping; the bill resting on the chest, or to the side. With legs bent, the belly rests on the branch or ground. The toes do not tightly grasp a wide branch, it is more of a balancing act.

A few terms should first be clarified. Roosting is a nocturnal activity and loafing, which includes many phases from inactivity to drinking, is a “general state of immobility,” probably associated more often with daylight behavioral patterns. Crows, by the way, are great loafers. Sleeping is

characterized by a slower eyelid blinking (peeking) rate compared to when a bird is loafing or at rest. When the eye is open, the bird is sampling its surroundings for predators or other social stimuli ^{a31}. Females of the Pinyon Jay settled into a sleeping posture (bill tucked or pointed forward)



After a few weeks under a tree used by roosting crows, the accumulated shit and pellets add several nutrients to the soil and a bicycle

before the male. In the morning, arousal was followed by much calling and short, rapid circular flights necessary to raise the metabolic rate of the body ^{b22}. Crows have similar flights in the morning's darkness as the first flocks set out hesitantly over the countryside to feed and play.

Male Herring Gulls in a sleep posture had a lower arousal threshold, and were the first to awake in the colony and chase predators ^{a30}. Sleeping Mallards showed a slower peeking rate the farther they were from shore and potential predators. And brightly colored males in the spring blinked more often than when they were





602. Crow shit is very rich in potassium (K). Nutrient averages of two soil samples at the roost of American Crows in **Oklahoma** compared to a control woodlot varied greatly in the late 1970s h94

AREA	SAMPLE SIZE	pH	NUTRIENTS ppm		
			Nitrogen NO ₃	Phosphorus P	Potassium K
Crow Guano	na	6.4	27	308	1612
Roost	2	5.1	48	135	189
Control	2	7.5	4	14	93

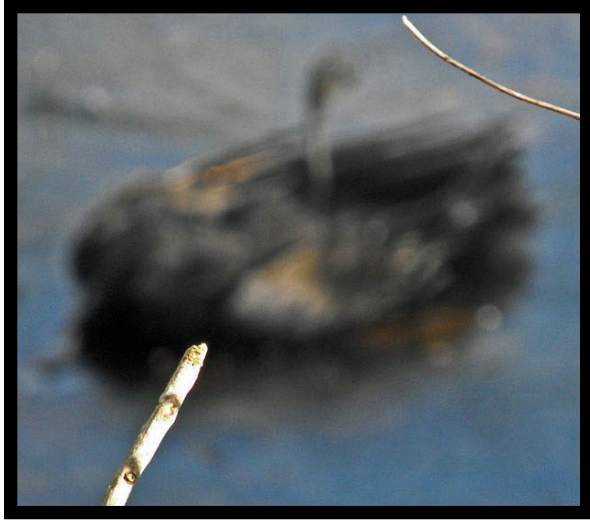
602a. 5 months post-roosting – Phosphorus levels were much higher in soil samples at the **Essex, Ontario** roost on 1 September 1980 compared to levels in a control woods

AREA	SAMPLE SIZE	pH	NUTRIENTS ppm		
			Magnesium Mg	Phosphorus P	Potassium K
Roost	16	6.1 (5.1–6.7)	200+	56 (24–100+)	261 (180–304)
Control	16	6.4 (6–6.7)	200+	15 (8–24)	254 (202–316)

602b. 1 month post-roosting – P and K levels were much higher in soil samples at the **Essex, Ontario** roost on 16 April 1981 compared to levels in a control woods

AREA	SAMPLE SIZE	pH	NUTRIENTS ppm		
			Magnesium Mg	Phosphorus P	Potassium K
Roost	10	6.9 (6.8–7)	200+	100+	400+
Control	10	7 (6.9–7.2)	200+	73 (68–76)	262 (248–280)





Death is often out-of-focus for many people

dressed in their eclipse plumage, and when compared to brownish females ¹³⁴.

In general, it is believed a bird's physiological sleep is like a mammal's sleep. Birds can achieve the deepest form of sleep with rapid eye movements (REM). This intense form of sleep along with short waking periods filled a sleep episode. Birds were easily aroused from sleep, including those experiencing REM sleep, by a visual or auditory disturbance ⁹⁷³.

Recent research on sleep in birds showed a slight difference from sleep in mammals. Sleep is composed of two measurable components ^{28r} –

- (1) non-REM, slow-wave sleep (SWS) with high amplitude low-frequency waves
- (2) rapid-eye movement (REM) sleep involves the low-amplitude, mixed frequency brain activity which is similar to wakefulness.

Data on sleeping of 23 bird species were gleaned from the literature using these comparable limitations –

- (1) adult birds in the non-breeding season
- (2) averages used from multiple studies of one species
- (3) most birds on an approximately equal 12 & 12 hour, day / night cycle over a 24-hour period, thereby limiting the effect of changes in daylight

Three corvids were studied. The closest in

weight to the American Crow was the Rook, *Corvus frugilegus*, at 524 grams, including a brain weight of 8 grams. Its sleep values over a 24-hr period were 7.5 hrs of SWS and 0.13 hrs REM, the latter occurring in brief bouts.

Furthermore, “unlike in mammals, the avian results provide little comparative support for an energy conservation or a memory consolidating / learning role for sleep in birds. There was no significant relationship between SWS and REM sleep and body mass, brain mass, or basal metabolic rate, which are among the strongest relationships in mammalian studies.” One relationship was between predation risk and SWS. As the risk of predation increased (high level of exposure at the roost site) the amount of SWS in birds was reduced ^{28r}.

A feature of urban roosting is the increased level of ambient light enveloping the sleeping birds. For some crows, a blaring street light might be only a few meters away. Recall how Rowan in the 1920s, using Slate-colored Juncos, showed the annual reproductive cycle was stimulated by longer days rather than a rise in temperature in the spring ^{30r}. One begins to wonder what effect the extra hours of artificial light at night each winter might have on a crow's regenerative powers. So far, the orangy nightly glow in a city has only attracted and enhanced the lives of millions of crows in North America.

Ways of controlling roosting crows

As long as crows roosted in the country they were tolerated, and shot. As soon as they shifted their beds into human sanctuaries, they became a problem – for a few whiners. Buildings, cars and sidewalks were decorated with crow shit. It was fascinating to watch how people reacted to crows. For example, a man, drunk and unsteady on his feet, walked along a sidewalk in **Hamilton** below leafless trees filled with crows at night. Crow shit sprinkled down. He was unaware and unconcerned. He did not look up or alter his stride. Ten minutes later, two teenaged girls traced his footsteps, but they were in a different state of mind. Suddenly, they realized where they were, screamed, covered their heads and ran off. Other people complained to elected officials and demanded action against the crows. Newspaper





reporters capitalized on the man versus nature situation. When a few thousand crows started sleeping in deciduous trees along streets in the town of Essex **Ontario** in the winter of 1984–'85, two Windsor Star headlines in late January 1985 rang out—**TOWN FINDS LIFE LIKE A HITCH-CKOCK MOVIE** and later **BATTLE OF THE BIRDS**. Early in March, the crows began to disperse to their nesting territories. With a sigh of relief, a 14 March story was titled—**BLACK CLOUD OVER TOWN LIFTS AS CROWS SEEK NEW HOMES**. Things and crows change. In the 14 January 2011 edition of The Windsor Star, section A5, Sharon Hill penned the article—**PESKY CROWS PICK CHATHAM AS NEW ROOST**. Essex Mayor Ron McDermott commented on the roosting crows that left his town and supposedly shifted to Chatham “I’m happier than a pig in caca.”

There is no easy solution to prevent crows from roosting in cities or towns. If we knew what they found attractive about our sanctuaries, it might be possible to discourage or redirect them to less troublesome areas. For now, however, crows can sleep where they choose.

The pest control people ran experiments using lasers to disperse crows at small (8–700 birds) night-time roosts. They tried a couple of

\$5,600 and \$7,500 lasers during the night when crows were already settled into their trees. At five locations in Davis **California**, the areas where the crows roosted were ranked on the amount of car and pedestrian traffic – Low (2 roosts); Moderate (2) and High (1 roost in trees at the busy parking lot of a shopping mall). Generally, when hit with a laser light, crows quickly dispersed from deciduous or coniferous trees in which they slept, but returned to the same trees in 15 minutes or less. Crows rarely called when leaving the roost in response to a laser light. The eyes of the crows were not damaged by the light. In some cases the number of crows at a particular roost increased after treatment with a laser light. No treated roosts were abandoned. The control people did not recommend the use of a laser light on its own, but they thought it might be of some help when used with other dispersal techniques ⁹⁴⁷.

From 2005–'07 crow effigies were used to disperse American Crow at roosts in the small city of Lancaster **Pennsylvania**. The crows roosted in well-lit areas close to stores, malls and parking lots. They slept in trees, on rooftops, and on the ground. The experiments were held at 6 roosts with 4,000–33,000 crows. Crow effigies included fresh carcasses, taxidermic mounts of Ameri-



Woodstock As the evening assemblies shifted about, crows sometimes alighted on buildings in an industrial area. The birds lined up single file so an amateur like me working alone can make a quick count of their number, then multiply it by a factor of 842 to arrive at the total number of roosting crows





Pesky crows pick Chatham as new roost

Essex residents sigh with relief

SHARON HILL
The Windsor Star

Tens of thousands of noisy, dirty crows that plagued Essex for decades...

What's called a murder of crows was so bad the town used to chase them with propane-powered bird bangers, resisting calls to shoot the crows out of the sky. One woman even suggested putting electrified chicken wire in trees.

CAO Wayne Miller said the guano was sometimes so thick that municipal workers had to shovel it off the sidewalks. It appears the crows have...

Kingsville. A year ago there were 5,141 spotted during a bird count.

"AS LONG AS THEY DON'T COME, I DON'T CARE WHAT THE REASON IS."

WAYNE MILLER

Pratt calls a spectacular sight. Now crow fans can just head to Chatham where Pratt thinks some of the former Essex crows have set up shop. It's hard to say why or if they'll be back, he said. They hang out in corn fields eating what didn't get harvested, and they also like garbage and roadkill.

Wheatley birdwatcher Dean Ware said the Chatham-Kent found 101 231 crows

American Crows often make headlines in newspapers for the wrong reasons. It seems the members of a large crow roost in the town of Essex may have shifted their dormitory to Chatham, **Ontario**. Sharon Hill, *The Windsor Star*, 14 January 2011, page A5

can Crows, and artificial crow models sold by a company that supplied fake crows to movie sets, etc. The effigies were hung in trees before the crows arrived in the evening to roost. As long as the crows saw the effigies, they were distressed and shifted to other trees. Distress calls and laser lights were also employed at the larger roosts at the same time. With proper timing and early detection, the crows can be shifted to another area of town where the new roost(s) may be acceptable to the surrounding people a71.

Disturbing crows at urban roosts includes pyrotechnics, shooting, poisoning with DRC-1339, lasers and remotely activated distress calls. Crows generally responded to most of these management practices by shifting their roost to a different part of the city. Even large-scale methods, organized by "experts," which included killing crows, can fall well short of the anticipated outcome. Other methods included trials with eyespot balloons, monofilament lines, mylar tape, netting, sticky repellents, strobe lights, electronic crow and owl calls, and water-misters. Strips of mylar tape on tree branches and pyrotechnic devices (fireworks) were relatively effective in dispersing urban roosts of crows g42.

A 260 cm wide balloon with five 60 cm wide eye spots was used to scare Carrion and Jungle Crows from their urban winter roosts in cities s72. This methodology and the results were criticized online by Christopher Tranter in 2007 at – (new method to scare crows).

At a roost of 25,000–50,000 crows in Auburn **New York**, crows were attracted to the downtown areas after the city installed brighter lights. Crows may use the extra light to help them see and avoid owls at night j35. However, when I



A car in **Hamilton** was unattended for weeks below deciduous trees used by roosting crows

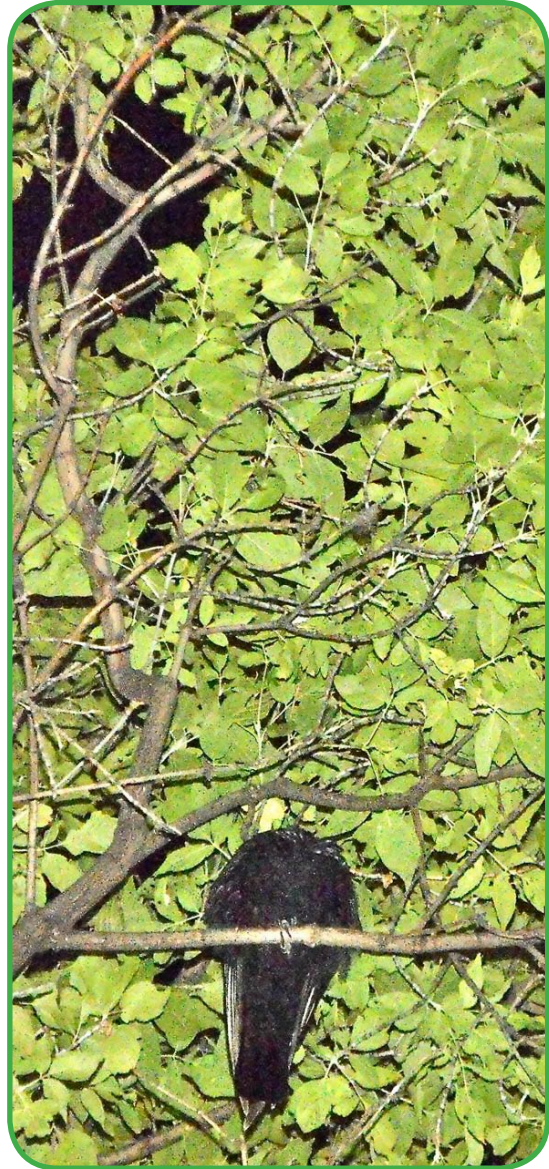




A pair of size 10 shoes walks over crow shit and regurgitated pellets on a sidewalk near the main library in **Winnipeg**. In September, a family of 4 crows roosted overhead in Manitoba Maple trees near their successful nest in the summer

visited Woodstock **Ontario**, in early December 2011, an estimated 50,000 crows roosted in the treed Brick Ponds Wetland Complex, a 32 hectare area devoid of artificial lights. This natural area, with several ponds in the eastern end of the city, is under the jurisdiction of the Upper Thames Region Conservation Authority. It is not likely to be developed, so the courage of crows may have found a quiet, dark roosting area within a city.

In September 2011, in Winnipeg **Manitoba**, I noticed a few patches of crow shit on a sidewalk leading to the main public library. Looking up one evening after sunset, two crows were about 1 meter apart in a leafy Manitoba Maple, *Acer negundo*. After a week, I revisited the site and only one crow could be found. The next week, about an hour after sunset, three unmarked crows with



About an hour after sunset in early September, a headless unmarked crow slept in a Manitoba Maple tree about 15 m from its successful nest in a spruce in downtown **Winnipeg**. Its head was turned and tucked into back feathers. The branch was worn from repeated use. Crow shit decorated the sidewalk below. The relaxed wings allowed the tips of the primaries to extend slightly past the tips of the tail feathers. The roosting tree had a dbh of 18 cm and was located 12 m from a street light taller than the tree used for roosting. The flash from my camera, about 7 m away, did not waken or frighten this crow





about 1 m between them and at different levels were in a group in one maple and a lone crow slept in the adjacent maple. It was probably a family unit sleeping on their territory. A successful nest in 2011 was in a conifer less than 20 m away from the roosting birds (**photo page 554**). The crows faced in different directions and were in the upper reaches, but not the very top of the leafy maples. A nearby street light made them obvious against the greenery. Taking flash photographs from the sidewalk did not disturb them. Heads

showed considerable fluctuations over the winter as crows shifted between roosts. A noisy human snow festival on 8 February was believed to have caused the crows to abandon one roosting site.

In the pleasure center of the city, large quantities of leftover food from restaurants were placed along streets and alleys as garbage. Here the crows dined on fresh gourmet food every morning. One complaint from a tourist appeared in the local newspaper. This forced the city to change its garbage policy. Garbage was collected at night on



Crows bathing in icy water in southern **Ontario** during the roosting season in early December

were turned backwards and bills tucked into feathers, giving them the appearance, from below, of headless birds. Some preening took place when they first settled into a tree and probably when they awoke during the night. They were silent after sunset. People walking below were unaware of the sleeping blackshirts. Cars, with their traffic-light induced rhythm, purred beneath them. The night was cloaked with both light and noise, which lulled the crows to sleep.

Success in Japan

Crows roosting in cities is a world-wide phenomenon. Sapporo is the largest city (1.8 million people) in northern **Japan**. Aside from small warm weather roosts, winter roosts of Carrion and Jungle Crows formed in downtown Sapporo. Counts at 6 roosts in the winter of 2002-'03 ranged from 5,000–10,000 birds. These numbers

the street while the crows slept, and new buildings were designed with an inside space to store the garbage. Garbage along the streets was also covered. The crow population dropped 85% in the downtown area.

In residential areas, the garbage had plywood boards placed around it and netting over it. At municipal dumps, flammable wastes from residential areas were incinerated and dumped as ash. It was speculated the female crows ate this ash, which contained 12% calcium by weight, along with other minerals, to enhance their egg production. At dump sites, several thousand crows were trapped and killed annually. The number of crows, however, remained about the same t04.

Over the summer in Sapporo **Japan** some nests were removed when citizens complained. In 2003 an estimated 600 nests were destroyed. This caused the crows, which had their nests





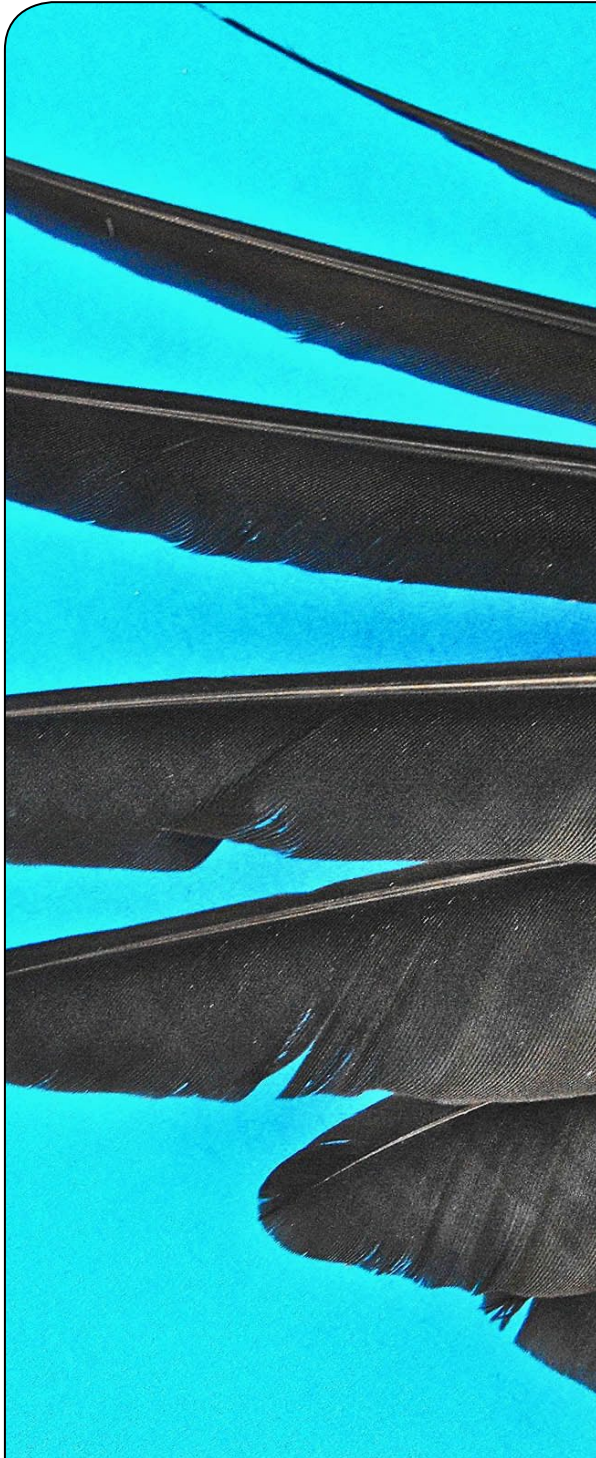
CHATHAM ONTARIO Morning at the roost in early December, 2011. Some crows flew directly from the trees out to the fields to feed. Others landed in a harvested soybean field (arrow), and formed a post-roosting assembly before leaving for the fields. It took 1 hour for the roost to empty this cloudy morning

destroyed, to become more aggressive against people (mostly men) dressed in certain clothes, especially when the clothes resemble those worn by workers that removed the nests. Through education on the ecology of the urban crows, people finally realized the crow problem was a human problem. When food sources (our garbage) were reduced through coverage and nocturnal removal, crows changed their habits and the level of conflicts with humans that shared their territory was reduced. As always, press coverage and pathetic political rhetoric only made matters worse. The Governor's "Crow Eradication Project" (doesn't that sound familiar) made the problem appear worse than it was. Some citizens were proud of coexisting with animals in their city ^{t04}.

Stepping around this so-called problem, if one enjoys birds, and crows in particular as I do, a large roost in or near a city provides a wonderful opportunity to observe the behavior of crows at close range and with little expense. The free show, often spectacular, and always well choreographed, is usually the best one in town.

Essex County **Ontario** is already famous for Jack Miner's Canada Goose Sanctuary and Point Pelee National Park, two havens for birds and their human followers. Why can't the people in towns and cities think outside the black box and come up with positive and innovative adventures for humans favored by flocks of roosting crows? Since the largest roosts in Canada develop each fall in southern Ontario, why not protect and pro-





A crow's primary philosophy of flight

mote them as a tourist attraction? The gatekeepers should take a hint from Rosemary Drisdelle, an online travel writer who invites us to partake in a late fall–early winter birding trip to Halifax **Nova Scotia**. She mentioned the location of a large crow roost at Mount Saint Vincent University on the Bedford Highway. By arriving an hour before sunrise you can watch the impressionistic sweep of departing crows. After that fabulous start, the rest of the day's birding unfolds.

The political leaders at towns and cities where crows roost, should erect a large, shiny black plaque with white lettering to pay tribute to these friendly, very useful, intelligent birds. They certainly are a plus to the corn farmers in southern Ontario ^{q05}. Instead, the mayor of **Essex**, unable to think outside his tiny political pocket, decided to organize a crow shoot. He did not like the birds and mistakenly feared crows would transmit rabies to townspeople (Windsor Star, 29 November 1983). This was a reasonable fear from a unknowing politician since southern Ontario was the hot spot for rabies in North America at the time, and crows do feed on road kills, some of which would harbor the virus. However, cooler heads prevailed on the town council and health authorities were contacted. The health authorities knew of no instance of crows transmitting rabies to a politician.

Crows in **Ontario** like to sleep together and alone. That is, they do not invite other bird species to join them in their slumber. It may be that no other birds want to. I have not noticed any line-ups. I did see one starling among crows in downtown Hamilton, but 5 minutes was all it could take. In the large roost at Essex, Mourning Doves, *Zenaidura macroura*, often slept in a separate part of the woodlot away from the crows. Elsewhere, mixed roosts sometimes developed. Near Dempsey **Oklahoma**, after proud state officials joyfully blew up 26,000 crows with dynamite on the night of 10 December 1939, they counted 20 White-necked Ravens among the bodies ⁱ⁰⁹. Did they consider this a bonus or a mistake? More than a century ago, at a large roost near Baltimore **Maryland**, American and Fish Crows were identified by their voices ^{e12}. In the Cape May area of southern **New Jersey**, a visual separation was easily made when a small number of crows settled into the trees to roost with a colony of im-





mature Little Blue Herons and egrets. The mixture of black-and-white was a striking pattern of this nightly gathering 66s.

In central **New Jersey**, from June–November of 1979 and 1980, an area of about 1,000 km² was searched for roosts of at least 2,000 birds in size, and holding several species of birds. Some held up to 100,000 birds. The peak numbers were from mid-August to early September. The 24 active roosts in New Jersey were mainly of European Starlings and Common Grackles. Seven other species were secondary at these roosts. American Robins, up to 20,000 birds (mostly juveniles), were an abundant secondary species in almost every active roost. Red-winged Blackbirds and Mourning Doves were also common, although fewer in numbers. American Crows were rarely observed at roosts of other species. The length of stay in roosts also varied. Where secondary species had feeding requirements quite different from the more numerous species, information transfer between the species was doubtful. For the more numerous secondary species, the formation of mixed species' roosts did not appear to be for protection against predators. Once a roosting site was established and working well, the site was used year after year. Other species probably join a roost to save the trouble and risk of trying

another site on their own. Researchers, however, cannot explain why birds roost where they do in the first place.

Roosting House Crows in **Singapore** caused problems for some people. At the roosts, 19 parameters were measured. Similar measurements were completed at non-roosting areas in the city. The usual results emerged. Crows preferred to sleep in tall, mature trees along roadsides and among homes. Dense crowns of trees and adjacent buildings helped to reduce the effects of weather. When trying to relocate roosting crows, it was necessary to have alternate roosting sites available. If the crows land at these alternate sites, they should be left alone. When allowed to quietly spend the night, they may return to the new site the next night and the problem may be solved. If this new site was outside a city or town, arrangements should immediately be made with the landowner to keep the crows on her property from being harassed by hunters, etc, which may drive them back into the safety of a city or town, where the discharge of firearms is not permitted. Information on where the crows feed and nest may also help when relocating the roost to a new site. Finally, was it a year-round roost or only a winter roost of birds that dissipated as the nesting season began? p29





Danger at the roost

Crows fell from the sky. Before sunrise, as birds poured from the Essex **Ontario** roost, an ice-storm struck. Thousands died. Over the next few days, bags of crows were hauled away. The Windsor Star published a picture of the devastation. There was an obvious gap in the population that remained for the rest of the winter. The next year, after one nesting season, fullness and vigor returned to the roosting flock (Mr and Mrs Meloche, pers. comm. 1987).

An early October hailstorm in **Oklahoma** killed 30 crows along with hawks, owls and rabbits ⁴³. These examples illustrate the vulnerability of crows to the forces of nature. The greater the size of the roost, the greater the possibility of multiple deaths from weather, man or disease.

refuge in their vicinity. On every side the carnage then raged fiercely, and there can scarcely be conceived a more forcible idea of the horrors of a battle than such a scene afforded.

The crows screaming with the fright and pain of wounds, the loud, deep roar produced by the raising of their whole number in the air, the incessant flashing and thundering of the guns and the shouts of their eager destroyers, all produced an effect which can never be forgotten by any one who has witnessed it, nor can it well be adequately comprehended by those who have not.

Blinded by the blaze of the powder and bewildered by the thicker darkness that ensues, the crows rise and settle again at a short distance without being able to withdraw from the field of danger; and the sanguinary work is continued until the



A huge gathering of crows can hardly go unnoticed. Man, a peculiar predator, is capable of astonishing violence against families of crows. In the 1800s it was known as “the harvest of crow heads.” Godman in 1830, vividly depicted an assault by humans on a crow roost ³⁰.

Armed with double-barreled and duck guns which threw a large charge of shot, the company was divided into small parties, and these took stations selected in the daytime so as to surround the roost as nearly as possible.

A dark night was always preferred, as the crows could not, when alarmed, fly far, and the attack was delayed until full midnight. All being at their posts, the firing was commenced by those most advantageously posted, and followed up successively by the others as the affrighted crows sought

shooters are fatigued or the approach of daylight gives the survivors a chance to escape. Then the work of collecting the heads from the dead and wounded began, and this was a task of considerable difficulty, as the wounded used their utmost efforts to conceal and defend themselves. The bill and half the front of the skull were cut off together, and strung in sums for the tax-gatherer, and the product of the night divided according to the nature of the party formed.

The first half of the 1900s ushered in a new and more explosive way of killing crows. Fueled by a ridiculous conservation ideal meant to preserve ducks and other wildlife for human hunters, roosts in the United States were laced with dynamite bombs and the charges touched off as the families of crows slept. Near Rago





Getting ready for the morning's crow shoot. Photograph © 2012 by David Scott, with permission.

Kansas, in one supreme moment, 75,000 crows died on a February night⁹³⁸. In **Texas** on 7 April 1937, Dr. Walter Taylor related how 60 bombs in the first charge killed about 40,000 crows and at the second round of 120 bombs (one stick of dynamite to each bomb) almost as many crows died⁹⁷⁵. But perhaps, even this loss would not be noticed after one nesting season had passed. After several more years, this moronic brand of conservation died out. The crow, thankfully, did not.

These feathered cadavers did produce a little scientific information. Emlen gathered the dead blackshirts to determine their sex ratio. In the Finger Lakes region of **New York** state, in three counties from December through March, the ratio was 12 males to 10 females. At another roost in late February in the Finger Lakes area, a sample of 53 crows produced 7 males to 10 females. Although admittedly small and restricted, the larger number of females in spring roosts might be due to "a differential migration period, or by an early desertion of the common roosts by male birds in favor of their newly established nesting territories"^{e36}. At Zanesville **Ohio**, 150 miles to the south, 75 crows gave a ratio of 7 males to 10 females^{h92}. At 4 large museums along the eastern seaboard, Emlen checked the sex ratios of 106 crow specimens. They also yielded a ratio of 7 males to 10 females.

The actual killing experience did improve the

outlook of some human participants. Walter Scott of the **Wisconsin** Conservation Department was part of an exercise resulting in the death of about 5,000 crows by dynamite on a March morning in 1938. He did not feel joyous about the confrontation, and expressed his hope it would be the last for the crows and men of Wisconsin^{s45}. There was a bright side to this imbecilic slaughter. The estimates of the number of crows killed by many conservation departments in the United States probably followed the trend in **Illinois**. Their counts were checked and the department's estimates were about twice the actual number of crows killed. Over the six years 1933-'39 in **Illinois**, Black placed the kill from shooting and dynamiting at about 100,000 crows per year. In his thesis, Black included seven black-and-white photographs of the dynamiting of a crow roost

at night, perhaps the only visual record of this brainless human activity^{20b}. In **Oklahoma**, over 400,000 crows were killed by 11 bombings in the winter of 1946-'47^{a50}. Earlier, from 1934-'45, bombings in Oklahoma destroyed 3.7 million crows⁹⁴¹. Also in Oklahoma, 26,000 crows were blown apart with dynamite near Dempsey while they slept on the night of 19 December 1937ⁱ⁰⁹. In one notable account, "Frank S Davis, inspector for the Illinois State Department of Conservation, killed 328,000 crows by using festoons of dynamite bombs in roosts near Rockford **Illinois**. The wholesale slaughter was given great publicity, appearing with photographs in the issue of *Life* for March 25, 1940"⁹⁷⁵. I was unable to get a copy of the original *Life* magazine article, but Michael Westerfield did, and included an excerpt from it in his book, *The Language of Crows*, which I will reproduce^{w56}.

At night, the locals would show up at the roost with sticks and baseball bats and wait as the Inspector set off his bombs. When the dynamite exploded some of the crows would be killed outright, but most fell to the ground stunned, at which point the farmers and sportsmen would beat the helpless birds to death with their sticks and bats. There's one photo of smiling men flailing away at wounded birds on the snow covered ground and another of a huge horse-drawn sled loaded with a heap of dead





crows and a few proud looking boys.”

The senseless thrill of blowing up crows at night was widely practiced throughout the Midwest and southern United States at this time. AO Gross wrote in 1946, “This unprecedented destruction of bird life has been received with both commendation and violent criticism. It is indeed unfortunate that departments of conservation find it necessary to destroy them”⁹⁷⁵. Now that

ity of the flesh was fine. In **Delaware Bay**, men and boys used to visit the crows’ nests among the reeds of Reedy Island. The older crow nestlings were sold to markets and restaurants in **Philadelphia**. An old lumberman remarked that the young crows were much sought after by the workers because they tasted better than young unfledged pigeons (squab)^{2b5}. If you go online and search for crow recipes, you will find several useful sites that provide instructions on how to cook American



crows roost in cities, we no longer blow them up. Perhaps that is why they use our cities. Their collective memory told them to sleep where people sleep.

A few localities took advantage of the small mountains of dead crows. Men suggested they might be good to eat, and so they are, as good as ducks and doves^{a11}. A physician in Tulsa **Oklahoma** held a crow banquet for his friends. The word delicious was frequently spoken during the conversation. E Good served fried crow to his family of four and the meat was “eaten with gusto”^{g34}. Back in **Oklahoma** City, merchants put dressed carcasses (267 grams) of crows on the market in the 1940s at 19¢ each. One woman plucked 21 crows to get 454 grams, the weight of one crow, in feathers. These feathers were better than chicken feathers for pillows because their blunt tips did not readily pierce the ticking^{a11}.

In a short 1897 article in *The Wilson Bulletin*, Burns ate a pair of nestlings, about 16 days old. After frying, they were presented to his family. One member said the bird was tough but the qual-

Crows. More than one makes a meal.

The ultimate book is **Crow Shooting**, by Bert Popowski (1946) p⁸⁰ which was reviewed by Charles Vaurie in the *Auk* (1947) **64**: 640. Bert described with “gross and wilful exaggerations” the enormous numbers of ducks’ eggs and ducklings destroyed by crows. In 1946 alone, 30 million ducks were eliminated by crows on the prairies, according to Bert’s, unnamed but “reliable surveys.” In 1949 Bert won the National Crow Shooting Championship in the United States, using crow calls he designed. He beat 51 other contestants. An amazing accomplishment from an amazing “writer and sportsman.” Way to go Bert.

Assuming that part of the motive for shooting and dynamiting crow roosts was to rid an area of these birds, and not simply to alleviate boredom and make oneself appear politically useful and fashionably hip, there was witnessed a proven but seldom used method^{b03}

Not often does one see a flock of Crows panic-stricken. One sundown in the late fall of 1923,





The rich agricultural fields of southern **Ontario** are separated by hedgerows of deciduous trees used as nest sites by crows. I spent years walking across fields like this in my youth; an experience that shaped my life and allowed the creation of this book on the American Crow, Naturally

in the woods on the eastern slope of Mt. Tom, our attention was drawn by the sudden hum of distant motors to the ill-fated airship Shenandoah, headed in our direction over the north end of the mountain. Suddenly from the hemlocks around the crest of Little Mt. Tom there arose a tumult of crow shouts, and a host of fleeing Crows. Never have we heard such terrified cries from Crows before or since, and rarely have we seen them attain such speed in flight. Due west they headed, over the mountain, and with madly flapping wings put as much distance as they could between them and that great speeding giant of the sky. I have not found them using that roost since.

SCIENTISTS

Crow scientists have long lists of our weird behavior
And seek to find crow reasons for them, one by one,
Until humans are fully known,
And thus unable to blow crows up with dynamite,
Or inject them with noxious substances,
Or shoot them with steel pellets,
And they store all these things in their crow brains,
Which are small, yes, but that's because
They serve as portals to the entire universe,
Which is where crows live, connected to everything,
Intoxicated with sun and air and moon,
Especially the moon, loved extravagantly by crows,
Who murmur appreciatively when it hangs in their
trees

– David Scott 2010

To maintain the attack against crows over a wide front and throughout the year, Canadians on the prairies, not blessed with large winter roosts they could dynamite, contributed their share of human resources and skill by destroying summer populations of crows in the country. Officially sanctioned by the Manitoba Department of Agriculture and Immigration, at least five reports gave the competition's rules and a list of the winners. **AWARDS IN CROW EXTERMINATION COMPETITION** titled the 1926 results. Thereafter, the word **GOPHER** was added to the title, just to be fair. The top prize each year was \$100. Alice won it in 1927 by beating out 1,841 hopefuls. At eight points per crow, two per crow egg, and one per gopher tail, Alice's 16,721 point total represented a lot of exterminating. The annual count of destroyed eggs ranged from 81,228 (1926) to 177,564 in 1929. About the same time, the Extension Service Boys and Girls Clubs in public schools throughout **Manitoba** offered a bounty of 5¢ per egg and 10¢ for two feet¹⁸⁵. With the completion of the first season, the 400,000 eggs and 35,000 pairs of feet depleted the funding. An annual bounty of \$3,000–\$6,000 kept the Crow Crusade going for 10 years until it was finally abandoned in 1930. No one ever mentioned how many more ducks were shot and eaten after all of these crows and potential crows were eliminated. Strange behavior indeed.

Crow shooting contests probably never really stopped. They continue today in the province under the indifferent eyes of **Manitoba** Conserva-





tion. In 2008 the shooting began on 25 May, when crows have young in the nest. It is always pleasant to think about nestlings dying of thirst after their parents have been shot for fun. Apparently other prairie provinces have similar contests. A recent letter (2 November 2011) I received in response from the Minister of Conservation in **Manitoba** mentioned that American Crows are not protected by The Wildlife Act. In other words, the management of American Crows is currently based on ancient ideas on how to address the species. The department's staff, I was told, were also not aware of any organized crow shoots presently taking place in Manitoba. The minister is either full of crow shit or looks away. This excerpt from 2008 was taken from the web. I copied a small part of the old-fashioned, flawed thinking some of the participants still maintain. For example –

“It’s just a sport,” said participant Joe Wanicka. “There are about 10 clubs in Manitoba.”

Some ranchers claim magpies are still a nuisance and will peck out the eyes of newborn calves or take chunks of meat out of an animal. Wanicka said the corvid family of birds are also notorious scavengers, raiding other birds’ nests for eggs and young ones.

“They wipe out all the little finches,” maintained Dan Nault, a regular participant in shoots. “There’s really nothing positive to say about them.”

If Conservation Departments on the prairies were staffed by contemporary thinkers, they would start a worthwhile educational program and get the migratory crows protected under The Wildlife Act. More crows would benefit more farmers.

“In Australia where the Crow has been similarly condemned, it has recently established itself as the most effective enemy of the blowfly which has spread over the country and so it will be here; no one can foretell at what moment we may be overrun with some pest against which the Crow will be the only efficient check. It is deplorable that those concerned with conservation should be led astray

by commercial interests or by their agents, whose object is directly or indirectly to increase the sale of ammunition” a51.

A hunter survey in **Oklahoma** from 1966–’71, found 2,084 hunters killed about 200,000 crows annually over the winter. Dedicated crow hunters were responsible for about 60% of this useless carnage i01. In an early report (1910) from **Illinois**, two hunters shot 197 crows in one day in December h90. In their 1980 national survey, two federal departments estimated there were 4.5 million crow hunter-days in the United States u04.

According to the **Kansas** Department of Wildlife, Parks and Tourism, as of August 1, 1990, hunting crows in Kansas ran from November 10 through March 10 with no maximum daily bag or possession limits (online).

For those of you that still enjoy a good crow hunt, visit crowbusters.com/gallery.htm, or search for – crow busters photo gallery – to admire piles of dead crows with the proud hunters of this elite killing squad perched nearby.

In **Nebraska** the crow hunting season was 1 October to 15 November, with no daily bag or possession bag limits. In 6 counties there was a special Public Health Hazard season from 16 November to 19 January. A hunting permit, habitat stamp and hunter education were necessary. (Nebraska Game and Parks Commission website, November 2011).

Many management ideas on corvids are based on myths, or outright lies from commercial interests. A few department personnel are enlightened, but most operate in darkness. The crows have adapted; we have not. Some of us continue to believe we are the only species that matters. ■



An Anthology of Quotations

Aside from many scientific writings on the American Crow, ornithologists and others have found it necessary to voice their opinion on this celebrated bird –

They belong to the noxious birds in this part of the world [Philadelphia], for they chiefly live upon corn. – **Peter Kalm 1749**

This is perhaps the most generally known, and least beloved, of all our land birds; having neither melody of song, nor beauty of plumage, nor excellence of flesh, nor civility of manners to recommend him. – **Alexander Wilson 1840**



What a perfectly New England sound is this voice of the crow! If you stand perfectly still anywhere in the outskirts of the town and listen, stilling the almost incessant hum of your own personal factory, this is perhaps the sound which you will be most sure to hear rising above all sounds of human industry and leading your thoughts to some far bay in the woods.

– **HD Thoreau 1859**

When two such playfellows pursue each other in this headlong swoop, their turnings and twisting reminds one of a shower of day meteors.

– **SM Rhoads 1886**

When they are gone the wintry field which for an hour has been associated with the noisy birds seems quite desolate. – **CL Edwards 1888**

Perhaps a limited check is needed to keep the species in its proper place.

– **Thomas McIlwraith 1894**

I do not believe the robbing of wild birds' nests by this species is nearly as common as we are led to believe; at least I have not found it so, although I have been witness to an occasional raid made by this bird upon the nests of the Purple Grackle and Robin. – **Reuben Strong 1895**

Held up as emblematic of the fallen, defeated, or unfortunate, the embodiment of cunning and cruelty, and published throughout the land as the personification of a knave and thief; is it any wonder that the ornithologist hesitates to defend the bird whose character is painted as black as its plumage? – **Frank L Burns 1895**

The crow is either a saint or a sinner depending upon the point of view.

– **Charles Townsend 1905**

Our Crows are developing into chicken and egg robbers far more exasperating than the Hawks.

– **Isaac Hess 1910**

Very destructive to ducks' nests. We found many of these nests in which the eggs were partly or wholly destroyed by crows. It was a common sight to see crows walking through and carefully exploring the grassy places where ducks were likely to nest. – **JF Ferry 1910**

ON CROW SHOOTING CONTESTS – It is at present the only means we have of combating the increasing menace of the crow.

– **Allan Brooks 1924**





For pure innocent mischief, it is difficult to imagine any living creature more adept than young crows, there is much of playfulness as well as a gentleness in this which strongly recalls the actions of young puppies. – **Norman Criddle 1927**

Undoubtedly the most destructive bird to our game life that we have, destroying countless numbers of eggs and young birds.
– **HV Williams 1926**

As to the value of the crow, let me tell you this. A crow will do no more good on the farm than a leghorn chicken that will lay a dollar's worth of eggs a month. And as for the grasshoppers the crow destroys, let me advise you to keep a flock of turkeys and condense those grasshoppers into fifty cents per pound.
– **Jack Miner 1929**

The only remedy is to reduce its numbers, if possible, to something like normal. Its destruction should be placed in the hands of trained agents, working according to a systematized plan under an official head.
– **Tom Roberts 1932**

The crow unquestionably is a remarkably clever bird.

– **George Gladden 1936**

There are indubitably too many Crows. Of no other native bird would we say such a thing, though the Grackle ('Crow Blackbird') is locally a nuisance in May and June, the Killdeer gets in our way when looking for rarer shorebirds, and the Black Duck bears such a 'hundred to one' relation to all other ducks that we weary of it. But how much more interesting the Crow would be if it had, not exactly rarity, but such numbers as for instance the Red-shouldered Hawk!

– **Aaron Bagg and Samuel Eliot 1937**

We fear that it is the lust for killing, just as in the case of hawks of Cape May Point, that is at the bottom of the Crow shoots, not the desire to protect crops on the one hand and song birds on the other! – **Witmer Stone 1937**

The crow is assuredly a hardy and eminently successful species. One could wish that it were also ornamental and useful.

– **Clyde Todd 1940**

Sentimental enthusiasts and some cautious agricultural investigators regard it as a valuable species. – **PA Taverner 1949**

The Crow is a mixed blessing and, like humans, is not all good and not all bad. – **LL Snyder 1951**

The crow is not a popular bird. The name to most men signifies sly cunning and treachery, the robbing of crop fields, and the destruction of wildlife. This reputation is based in part upon fact, but superstition, erroneous observation, and mistaken opinion have also contributed to its development.

– **Ernest E Good 1952**

Black is an unfortunate colour for a large, omnivorous bird. Whatever redeeming traits the crow may have (and it has many), the bird's very blackness seems to condemn it. Few native animals have been persecuted with such savage persistence.... There is no blood-thirstiness like that of the self-righteous.

– **John A Livingston 1970**





There is also the intriguing element about corvids that is of the unknown. These birds are more than descriptions by weight, measure, color, and distribution, for behind their amber eyes are answers to questions we may never learn to ask.

– **Tony Angell 1978**

There is much to admire in their intelligence and in the order and complexity of their lives as well as in their beauty.

– **James Lansdowne 1980**

Felicity knew the crow stole corn and grain and had to be chased from the fields, and she knew she should hate it, and she didn't. It was as though it was part of herself.

– **Keitha MacIntosh 1982**

They are dissatisfied with the narrow goals and horizons of that tired old Darwinian struggle.

– **David Quammen 1985**

But I have heard they can be taught to talk, and I am sure they would be charming dinner guests.

– **Heidi Holder 1987**

A huge swirling flock of roosting crows can be a spectacular sight.

– **Scott Craven 1990**

Though people generally do not think of them in such terms, crows are remarkably graceful: from the tip of a crow's beak to the end of its tail is a single curve, which changes rhythmically as the crow turns its head or bends toward the ground.

– **Boria Sax 2003**

When you look in their eyes, you can see that somebody's in there, especially if they know you.

– **Barbara Kirpluk 2004**

Until I met PK, I always thought crows were just another bird.

– **Connor Duncan 2005**

They are mystic messengers who can warn us of danger, carry souls of friends to the afterlife, and stimulate our art, language, and pop culture.

– **John Marzluff 2005**

But in death, crows seem to be eminently ignorable. Neither reviled enough to be horrific nor beautiful enough to be lamented, they are, perhaps, one of the most perfectly ignored dead animals in the world.

– **Lyanda Haupt 2009**

So many people have come up to me and told me pet crow stories. And everyone raves, they tell the stories in that loving way you tell your first dog or your first cat story. The crows enjoyed their company, they were loyal, intelligent.

– **Susan Fleming 2009**



If humans have an innate potential for personal development, how can we know that the crow is not self-powered to do the same?

– **Daniel Gade 2010**

I like the way crows treat us with disdain.

– **Tom Reaume 2011**

In a very real sense the communal winter roost is the matrix that ties together all the complex elements of crow society.

– **Michael Westerfield 2011**

The most important scientific revolutions all include, as their only common feature, the dethronement of human arrogance from one pedestal after another of previous convictions about our centrality in the cosmos.

– **Stephen Jay Gould (1941–2002)**

